IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

INTELLECTUAL VENTURES I LLC, Plaintiff, v. T-MOBILE USA, INC., T-MOBILE US, INC., ERICSSON INC., and TELEFONAKTIEBOLAGET LM ERICSSON Defendants.	Civil Action No. 2:17-cv-00577-JRG **JURY TRIAL DEMANDED**

PLAINTIFF INTELLECTUAL VENTURES I LLC'S
OPENING CLAIM CONSTRUCTION BRIEF

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I. INTRODUCTION

Plaintiff Intellectual Ventures I LLC ("IV") submits this brief in support of its proposed claim constructions. The claim terms at issue are, with few exceptions, straightforward terms that would be understood by a person of ordinary skill in the context of the patents and their prosecution histories. Each of IV's proposed constructions is fully supported by the intrinsic evidence as well as the canons of claim construction.

II. OVERVIEW OF THE TECHNOLOGY

The patents in suit are directed to methods for efficiently and reliably transmitting digital communications, such as voice, data, and video streams, over a wireless telecommunications network. *See, e.g.*, Ex. 1[1] ('206 patent) at 3:43-4:40.

Historically, voice and data packets travelled on separate networks, and network operators could customize the transmission parameters for the type of traffic. *See, e.g.*, *id.* at 12:18-44. For instance, voice packets must be delivered in a timely manner, but callers can tolerate an occasional dropped packet. *See, e.g.*, *id.* at 62:39-48. On the other hand, the timing of Web traffic delivery is much less important, but avoiding dropped packets is crucial. *Id.* Customizing the transmission parameters caused no difficulty when voice and data were sent on separate networks. However, the situation changed dramatically with the advent of packetized voice, which permits the mixing of data and voice packets on the same network. Combining different types of traffic has significant benefits, but it also creates a problem: how to guarantee the required qualify of service ("QoS") for each traffic type. *See, e.g.*, *id.* at 11:41-47.

The patents-in-suit solve particular aspects of this problem through the application of inventive data scheduling and resource allocation at the network level. For example, the '206

[1] "Ex. __" refers to the exhibits to the Fellowes Declaration filed concurrently herewith.

and ’971 patents claim methods and systems for analyzing, classifying, and scheduling IP flows on a packet-by-packet basis based on unique QoS requirements. Certain claims of the ’206 and ’971 patents also describe how to optimize the QoS requirements for IP flows that are transmitted across a network serving many IP flows simultaneously. The ’629 patent also addresses a problem that arises in a wireless packet-switched network, namely the jitter and other quality problems that can arise when certain IP flows are scheduled with irregular time gaps between the packets. The ’517 patent is directed to the allocation of bandwidth among the multiple user devices (“UEs”) to ensure that QoS requirements are satisfied for each flow.

III. ARGUMENT

A. Packet Transmission Variation Terms: “in an isochronous manner” and “periodic variation”

1. Technical Background

The patents in suit describe how to send data over a wireless network in frames. Each frame covers a period of time, and that time period is divided into slots. For instance, one 20 ms frame can be divided in 20 slots of 1 ms each.

Figure 14 shows a number of examples of this technique:

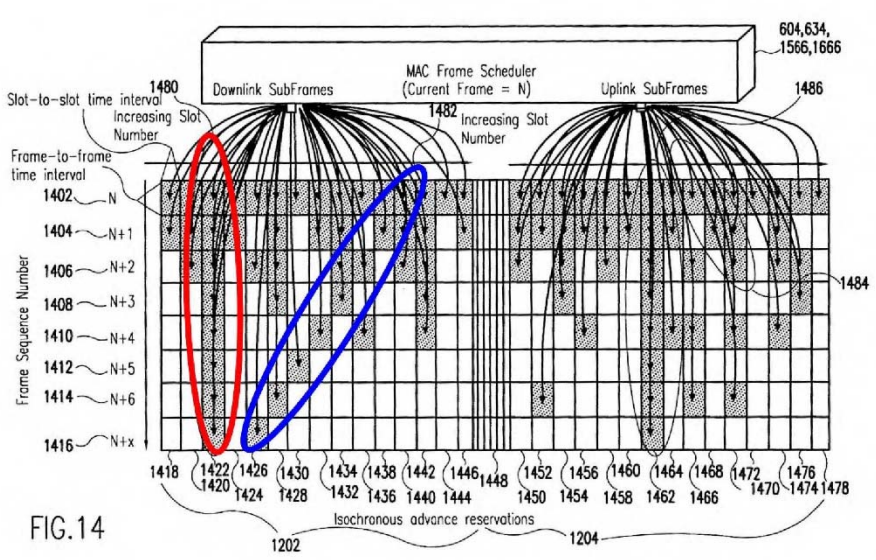

FIG.14

Each row above is a frame and each box is a time slot within a frame. Reservation pattern 1480 (marked in red) shows a packet flow in which the packets associated with a particular IP flow (for instance a single voice over IP call) have been scheduled to be sent in the same slot in each frame. In our 20 ms frame / 1 ms time slot example, that would mean that the transmissions are 20 ms apart. Reservation pattern 1482 (marked in blue) shows a packet moving one slot per frame. Here, the packets are sent in a regular pattern, 19 ms apart, which has the effect of moving the packet transmission slot by one in each frame.

2. "in an isochronous manner"—'629 claim 1, '971 claim 12, '206 claim 123

IV's Proposed Construction	Defendants' Proposed Construction
"in a manner which provides for consistent timed access"	"according to a consistent time interval"

The term "in an isochronous manner" is taken directly from the specification, which describes isochronous traffic as follows:

> In this definition, QoS implied the ability to carry asynchronous (i.e. transmission of data through start and stop sequences without the use of a common clock) as well as **isochronous (i.e. consistent timed access** of network bandwidth for time-sensitive voice and video) traffic.

Ex. 3 ('629 patent) at 13:55-60[2] (emphasis added). The intrinsic evidence is consistent with this definition. For instance, the additional references to "isochronous" in the specification confirm the patentee's definition of "consistent timed access." *See, e.g., id.* at 61:41-44 ("For calls that are sensitive to jitter, meaning calls that are time sensitive, it is important to maintain an isochronous (i.e., in phase with respect to time) connection."); Fig. 14 (illustrating an

[2] The '206 and '971 patent specifications are identical to the '629 patent specification with respect to the cited portions.

embodiment of the claimed invention and showing packets scheduled in a manner which provides consistent timed access to network bandwidth); 50:59-61 ("The advanced reservation algorithm for use in scheduling, e.g., isochronous traffic, is described with respect to FIG. 14 below.").

Defendants' construction unnecessarily alters the patentee's definition. Instead of "consistent timed access," Defendants have proposed "consistent time ***interval***." There is no basis for altering the definition expressly provided in the specification. If there is no difference in meaning, then there is no rationale for selecting a different word. And if there is a difference in meaning, then Defendants should explain what it is, something they have refused to do to date.

3. "periodic variation"—'629 claim 3, '971 claim 14

IV's Proposed Construction	Defendants' Proposed Construction
Plain meaning, regular variation of the location within frames into which the data is successively placed.	"changing of the placement between frames, while maintaining a consistent time interval"

Claim 2 of the '629 patent and claim 13 of the '971 patent[3] claim methods of assigning future slots of a transmission frame to data packets where there is "a periodic variation between the placing of said first data packet in said first slot and the placing of second data packet in said second slot." In the claimed method, the number of time slots between the placement of the first and second data packets is consistent, but it results in the data packets being placed in a different slot location within successive transmission frames. Thus, the location of the data packet within a transmission frame varies, and that variation is periodic, i.e., it varies by a regular amount.

For example, as discussed above, Figure 14 shows examples of the slot for a packet flow

[3] Neither claim 2 of the '629 patent nor claim 13 of the '971 patent is asserted by IV in this case. However, claims 3 and 14 respectively are asserted and include the term "no periodic variation."

moving (blue oval). If the consistent time access between the first and second data packets is longer or shorter than the length of a single transmission frame, then the slot location of the data packets will vary:

> As another example, diagonal reservation 1482 shows a jitter sensitive signal receiving a slot varying by a period of one between sequential frames. Specifically, the signal is assigned slot 1440 in frame 1402, slot 1438 in slot 1404, . . . slot 1426 in frame 1416, to create a "diagonal."

'629 patent at 61:51-56. This is what is meant by periodic variation.

Plain meaning will suffice here. Defendants' proposed construction is unhelpful and designed to sow jury confusion. It is the location of the data packet *within* the transmission frame that varies. The placement does not change *between* frames as Defendants propose.

B. "host workstation"—'971 claim 12

The parties dispute the meaning of the term "host workstation," which appears in asserted claim 12 of the '971 patent. The parties' respective constructions are as follows:

IV's Proposed Construction	Defendants' Proposed Construction
Plain meaning, a computer or other device that communicates with other computers on a network and includes a terminal or interface to accept input.	"end-point running one or more applications and serving as the source or destination of an IP flow to or from a subscriber end-point"

IV's proposed construction of "host workstation" is wholly consistent with the '971 patent specification. A "host workstation" is a commonly used generic term, and Defendants' attempt to constrict the meaning of the term should be rejected. The specification provides numerous descriptions of host workstations. For instance, the preferred embodiments describe a "host workstation" or "host computer" [4] as a computer that communicates with other computers

[4] The terms "host workstation," "server," and "host computer" are used interchangeably in the specification. *See* '971 patent at Figure 3B ("Host Workstation 136a"); 34:43-48 ("[A] local area network (LAN) 128a including a client workstation 138a and a server 136a are coupled to

on a network:

> Network 148 includes an example **local area network including a plurality of host computers such as, e.g., client workstation 138 and server 136**, coupled together by wiring including network interface cards (NICs) and a hub, such as, e.g., an Ethernet hub. The LAN is coupled to data network 142 . . . which permits data traffic to be routed to workstations 144 and 146 from client 138 and server 136.

Ex. 2 ('971 patent) at 30:49-56 (emphasis added). Accordingly, the definition of "host workstation" must include client work stations and servers. *See also id.* at Fig. 3B (depicting "Host Workstation 136a" as a computer that communicates with other computers via a "Data Network"); 31:56-60 ("A local area network (LAN) can be thought of as a plurality of host computers interconnected via network interface cards (NICs) in the host computers . . . [and] copper wires so as to permit communication between the host computers."); 32:6-8 ("Communication occurs between host computers on one LAN and host computers on another LAN . . .").

The specification further discloses embodiments in which host workstations include a terminal or interface to accept input, such as, for example, from a user sending an email. *See e.g.*, *id.* at Figs. 1 & 2A (depicting workstations as computer terminals with monitors); 64:24-31 ("Examples include . . . **an e-mail from a LAN 128a attached host workstation** . . ." (emphasis added)). The specification also describes exemplary embodiments in which a host workstation may communicate with or send information to and from other host workstations, clients, base stations, Customer Premises Equipment (CPE) stations, and subscribers. *See id.* at 30:53-56 (disclosing a host workstation communication with other host workstations); 64:1-4 (same);

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data network 142 via network router 140a. Similarly, LAN 128f having a client workstation 138f and a server 136f are coupled via network router 140f to data network 142."); 30:49-51 ("an example local area network including a plurality of host computers such as, e.g., client workstation 138 and server 136").

32:6-9 (same); 72:36-41 (disclosing host workstation communication with wireless base stations), 73:47-49 (disclosing host workstation communication with CPE stations); 76:12-25 (disclosing host workstation communication with subscribers). Thus, the plain meaning of "host workstation" should be adopted—that of a computer or other device that communicates with other computers on a network and includes a terminal or interface to accept input.

Defendants improperly try to limit this general term to a narrow example in which the host workstation is an "end-point running one or more applications and serving as the source or destination of an IP flow to or from a subscriber end-point." This construction conflicts with the intrinsic evidence because there is nothing in the '971 specification that dictates that "host workstations" must serve "as the source or destination of an IP flow" only "to or from a subscriber end-point." *Dealertrack, Inc. v. Huber*, 674 F.3d 1315, 1327 (Fed. Cir. 2012) ("[I]t is improper to read limitations from a preferred embodiment described in the specification—even if it is the only embodiment—into the claims absent a clear indication in the intrinsic record that the patentee intended the claims to be so limited."). Indeed as explained above, a host workstation may, at the very least, communicate IP flows between other host workstations in addition to subscribers. *See* '971 patent at 32:6-9 ("**Communication occurs between host computers on one LAN and host computers on another LAN** via, for example, an internet protocol (IP) protocol." (emphasis added)); *see also id.* at Figure 3B ("Host Workstation 136a") and 30:49-56. Defendants' attempt to artificially narrow the meaning of "host workstation" to only specific preferred embodiments is improper and should be rejected. *See Renishaw PLC v. Maposs Societa per Azioni*, 158 F.3d 1243, 1250 (Fed. Cir. 1998) ("if an apparatus claim recites a general structure (e.g., a noun) without limiting that structure to a specific subset of structures (e.g., with an adjective), we will generally construe the claim to cover all known types of that

structure that are supported by the patent disclosure.").

C. "to optimize end user quality of service (QoS) for an Internet Protocol (IP) flow"—'971 claim 12, '206 claims 1, 19, 121

The parties dispute the meaning of the following related terms in the asserted claims:

1) "to optimize end-user quality of service (QoS) for an Internet Protocol (IP) flow" ('971 patent claim 12[5], '206 patent claim 121)

2) "so as to optimize end-user quality of service (QoS) associated with said IP flow" ('206 patent claim 1)

3) "so as to optimize end-user internet protocol (IP) quality of service (QoS)" ('206 patent claim 19)

The parties' respective constructions are as follows:

IV's Proposed Construction	Defendants' Proposed Construction
1) "to differentiate between types of traffic or service types and allocate a different level of system resources to an Internet Protocol (IP) flow" 2) "so as to differentiate between types of traffic or service types and allocate a different level of system resources to said IP flow" 3) "so as to differentiate between types of traffic or service types and allocate a different level of system resources to an Internet Protocol (IP) flow"	Indefinite

1. The Specification Supports IV's Construction

Quality of Service or "QoS" is a well understood term in the telecommunications world. The phrase appears in over 43,000 patents in the USPTO database.[6] A person of ordinary skill

[5] This term in the '971 patent differs only from '206 patent in that "end-user" does not have a hyphen.

[6] A search for 'QoS' or 'Quality of Service' in the abstracts and specifications of patents in the PTO's full-text patent database returned 43,410 patents, all of which appear to be in the telecommunications field."

would have understood that in a telecommunications network, end user QoS associated with an IP flow refers to specific metrics of a data transmission link, such as packet loss, bit rate, latency, and jitter that reflect the QoS for a particular type of IP flow. *See, e.g.*, '206 patent at 21:41-58, 13:16-27. Wireless carriers live or die based on the quality of service they provide to users, and test and tune their networks to try to ensure they provide the best QoS possible.

As the specification explains, "QoS can be thought of as a mechanism to selectively allocate scarce networking, transmission and communications resources to differentiated classes of network traffic with appropriate levels of priority." *Id.* at 12:7-10. The specification describes various metrics used to prioritize data traffic and selectively allocate network resources to attain a level of performance for a particular type of IP flow. *See, e.g.*, *id.* at 11:31-38.

Whether the network has delivered acceptable end user QoS depends on the type of IP flow:

> For some applications such as an initial screen of a Web page download, data transmission speed is the best measure of QoS. For other applications, such as the download or upload of a spreadsheet, the best measure of QoS can be the minimization of transmission error. For some applications, the best measure of QoS can be the optimization of both speed and error. For some applications, the timely delivery of packets can be the best measure of QoS. . . . The nature of the data application itself and the desired end-user experience then can provide the most reliable criteria for the QoS mechanism.

Id. at 13:34-48. *See also id.* at 11:31-34 ("In data networking, quality usually implies the process of delivering data in a reliable and timely manner. **What is reliable and timely is dependent on the nature of the traffic being addressed**." (emphasis added)), 10:61-11:54, 13:19-28, 13:34-48, 32:4-12, 39:7-20, 40:59-41:3, Figs. 2, 4. Thus, the specification describes various metrics used to prioritize data traffic and selectively allocate network resources in order to attain a level of performance for a particular type of IP flow. *See, e.g.*, *id.* at 11:31-38.

For prior art networks, it was understood how to achieve acceptable end user QoS for

each particular type of IP flow. For example, circuit-switched networks ensured a reliable connection by dedicating the entire bandwidth of the circuit for that connection. *Id.* at 3:50-4:32, 12:18-44. However, allocating bandwidth on a circuit-by-circuit basis is inefficient and wasteful. *Id.* The claimed invention, which uses a packet-switched network, means that network resources can be more efficiently allocated, but the challenge is maintaining acceptable end user QoS for a particular type of IP flow. *Id.* at 4:4-32, 12:6-17, 13:5-28.

The claimed invention is directed to methods and systems of allocating network resources in order to optimize end user QoS associated with each IP flow. It follows that this optimization happens at the network level, through the application of network scheduling functions. Thus, a person of ordinary skill in the art would understand that the task of optimizing end-user QoS associated with an IP flow is performed by a network operator. *See, e.g.*, *id.* at 51:4-16, 57:1-10. Indeed, the specification expressly describes how to optimize end-user QoS for a particular IP flow at the network level:

> **In order to implement a practical QoS mechanism**, it is desired that a system be able **to differentiate between types of traffic or service types so that differing levels of system resources can be allocated to these types**. It is customary to speak of "classes of service" as a means of grouping traffic types that can receive similar treatment or allocation of system and media resources. Currently, there are several methods that can be used in wireline network devices to implement differentiated service classes. Example methods include traffic shaping, admission control, IP precedence, and differential congestion management. **It is desired that an IP-centric wireless broadband access system use all of these methods to differentiate traffic into classes of service, to map these classes of service against a QoS matrix, and thereby to simplify the operation and administration of the QoS mechanism**.

*Id.*at 14:10-25 (emphasis added). *See also id.* at 13:24-28, 13:31-34, 14:50-57, 41:26-29, 44:30-35, 47:25-56, 49:1-5, 49:59-50:23, 51:62-52:4, 61:9-18, 62:31-48, 63:1-21, 63:46-54, 64:17-23, 66:60-67:3, 68:24-39, 68:54-69:8, 69:35-48, Figs. 7, 8A, 15A.

The specification also details *how* to differentiate between types of traffic or service types

and allocate a different level of system resources to an IP flow. For example, the specification describes several methods of prioritizing data packets for transmission (*id.* at 15:16-18:21, 18:55-19:6, 19:23-36) as well as the disadvantages of using any one method in isolation (*id.* at 20:48-21:58).

> For example, latency and jitter sensitive IP telephony, other H.323 compliant IP streams, and real-time audio and video streams can be given a higher priority for placement in the wireless transmission frames. On the other hand, hypertext transport protocol (HTTP) traffic, such as, e.g., initial web page transmissions, can be given higher bandwidth reservation priorities for that particular application task. Other traffic without latency, jitter, or bandwidth requirements such as, e.g., file transfer protocol (FTP) file downloads, email transmissions, can be assigned a lower priority for system resources and placement in the wireless transmission frame.

Id. at 21:47-58.

2. IV's Construction Is Drawn Directly from the Prosecution History

IV's proposed construction is confirmed by the prosecution history of the '206 and '971 patents and their family members. During the prosecution of U.S. Appl. No. 09/349,478[7] ("the '478 application") the claim term at issue was "a resource allocator that allocates said shared bandwidth to said subscriber CPE station and optimizes end-user quality of service (QoS)." Ex. 5, at 4-5 (Amended cl. 1). In response to the Examiner's rejection under § 102(e) the applicant explained that amended claim 1 could be distinguished over the prior art for the following reason:

> The present invention optimizes end-user quality of service (QoS) **by differentiating between types of traffic or service types so that differing levels of system resources can be allocated to these different types**. See Specification, from line 23 of page 24 to line 2 of page 25; page 97, lines 14-18; page 119, lines 1-6. By creating a finite number of discrete classes of service, multiple IP flows can be consolidated and handled with a given set of QoS parameters by the QoS

[7] Portions of the '478 application prosecution history are cited on the face of the '206 patent, including the applicant's March 27, 2002 Response to Office Action, and the applicant's August 21, 2002 Response to Official Action.

> mechanisms. See Specification, page 31, lines 21-22.
>
> . . .
>
> Meier's system has no awareness of the contents of packets, and has no knowledge of specific application needs of the packet so as to be able to tailor any special bandwidth allocation to the packet. Thus Meier cannot and does not allocate bandwidth to optimize QoS. Meier fails to disclose a resource allocator that optimizes end-user quality of service (QoS). **End-user quality of service (QoS) is not optimized in Meier because differentiating between types of traffic or service types is required in order to optimize end-user quality of service (QoS)**.

Ex. 5 at 13-14 (emphasis added). *See also id.* at 17; Ex. 6 at 4-5, 7-9.

Similarly, during the prosecution of U.S. Patent No. 6,862,622, grandparent to the '971 patent, the applicant explained that "The concept of end-user quality of service (QoS) as a mechanism is discussed at great length in Appellant's specification and the Examiner is directed to the specification for definitions relating to circuit-switched QoS, ATM QoS, circuit-centric QoS, packet-switched QoS, end-user optimized QoS and IP QoS. See for example, Appellant's specification at pages 5, 6, 22 and 35-40." Ex. 7 at 11. In reversing the Examiner's rejection, the Appeals Board noted in its decision that "The invention allocates a wireless bandwidth and other resources based on contents of packets to be transferred. Contents of packets are analyzed to characterize QoS requirements for applications associated with packets of Internet Protocol ("IP") flows." Ex. 8 at 3. The Appeals Board also agreed that QoS is defined with respect to the type of IP flow using a known set of network metrics: "Here, the appellant's specification discloses that 'packet header field information 700 ... can be used to identify IP flows and the QoS requirements of the IP flows.'" *Id.* at 7.

3. The Claim Terms at Issue Are Not Indefinite

Defendants offer no construction, seeking instead a finding that the terms at issue are indefinite. It is Defendants' burden to establish by clear and convincing evidence that "[A] patent is invalid for indefiniteness if its claims, read in light of the specification delineating the

patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention." *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2123 (2014). Whether a claim is indefinite is determined from the perspective of one of ordinary skill in the art as of the time the application for the patent was filed. *Id.* at 2130. That determination often turns on underlying factual issues, as is the case here.

Defendants have not provided a factual record in support of their indefiniteness defense, much less established a right to relief at the claim construction phase. They cite to Dr. Rubin's expert declaration addressing a means-plus-function claim term claim 20 of U.S. Patent No. 6,640,248 ("the '248 patent"), but they have not provided an analysis of the claim terms at issue here, which are not in means plus function format and have different claim language.

For instance, the full element at issue in claim 12 of the '971 patent is: "a scheduler that allocates resources of said shared wireless network among said wireless network stations to optimize end-user quality of service (QoS) for an Internet Protocol (IP) flow, wherein said IP flow is associated with a least one of a latency-sensitive and a jitter-sensitive application." The plain sense of this element is that the scheduler gives priority to a particular application, such as jitter-sensitive voice. Similarly, the '206 patent refers to optimizing the system for an IP flow, with voice being the most important example. As detailed above, the '206 specification contains numerous examples of adjusting specific metrics associated with a particular type of IP flow to achieve acceptable end-user QoS. *See, e.g.*, '206 patent at 14:10-25, 13:24-28, 13:31-34, 14:50-57, 41:26-29, 44:30-35, 47:25-56, 49:1-5, 49:59-50:23, 51:62-52:4, 61:9-18, 62:31-48, 63:1-21, 63:46-54, 64:17-23, 66:60-67:3, 68:24-39, 68:54-69:8, 69:35-48, Figs. 7, 8A, 15A. The specification explains that parameters are optimized by a network operator and gives as a specific example giving priority to voice calls in mixed voice/data networks. There is nothing

mysterious, much less indefinite, about the asserted claims.

Finally, at the minimum, there is a triable issue of fact regarding indefiniteness. The Court cannot accept lawyer argument at a claim construction hearing in lieu of facts. Defendants have not provided a prima facie case, let alone met their burden to establish invalidity as a matter of law. As belt and suspenders, IV has submitted the Declaration of Dr. Tim A. Williams establishing that a person of ordinary skill in the art would be familiar with the data transmission metrics associated with each type of IP flow and understand the scope of the claim terms here with reasonable certainty. Ex. 9[8]. The Court should construe the claim terms at issue and deny Defendants' request for a finding of indefiniteness.

D. Clam 12 of the '971 Patent

1. "assigning means for assigning future slots of a transmission frame to a portion of said IP flow in said transmission frame for transmission over said shared wireless network"

The parties dispute the meaning of the "assigning means" terms in claim 12 of the '971 patent. The parties' respective constructions with respect to the first reference to the assigning means are as follows:

IV's Proposed Construction	Defendants' Proposed Construction
Means-plus-function limitation under § 112 ¶ 6. Function: assigning future slots of a transmission frame to a portion of said IP flow in said transmission frame over said shared wireless network Structure: MAC subframe schedulers 1566 or 1666	Means-plus-function limitation under § 112 ¶ 6. Function: "assigning future slots of a transmission frame to a portion of said IP flow in said transmission frame for transmission over said shared wireless network" Structure: downlink scheduler 1566 or uplink scheduler 1666, implementing an algorithm that assigns future slots to a portion of an IP

[8] July 10, 2018 Expert Declaration of Dr. Tim A. Williams in Support of Intellectual Ventures' Proposed Claim Constructions is attached hereto.

	flow based on the priority of the IP flow, as described at '971 Patent 61:65-62:11

Analyzing the claim, the first "assigning means" in claim 12 actually has four functions: it assigns slots in future transmission frames as indicated in this element, but it also performs the following three additional functions described in the next element of the claim:

> wherein said assigning means comprises:
> means for applying an advanced reservation algorithm:
> means for reserving a first slot for a first data packet of an Internet Protocol (IP) flow in a future transmission frame based on said algorithm:
> means for reserving a second slot for a second data packet of said IP flow in a transmission frame subsequent in time to said future transmission frame based on said algorithm, wherein said second data packet is placed in said second slot in an isochronous manner to the placing of said first data packet in said first slot.

It follows that the "assigning means" must be broad enough to encompass all four functions.

Both parties agree that the element that performs these functions is the 1566 or 1666 MAC subframe schedulers. The parties dispute whether the jury should be instructed that the scheduler must "implement[] an algorithm that assigns future slots to a portion of an IP flow based on the priority of the IP flow, as described at '971 Patent 61:65-62:11." This additional limitation is unnecessary and confusing in light of the claim language following the term which details the three elements of the "assigning means" and how it carries out its function. The jury would look only to columns 61 and 62 of the patent, which would unduly limit the scope of the assigning means and potentially conflict with the remaining three means elements, some of which Defendants assert are discussed in other columns of the patent. This will cause confusion at trial.

Moreover, Defendants' construction is clearly erroneous and contrary to the plain language of the claim and specification. For instance, the specification expressly states that the

future slots for "data packets" are reserved based on the "priority of the IP data flow with which the packet is associated," not the "priority of the IP flow." '971 patent at 61:65-62:1. This improperly writes "packets" out of the function entirely. Focusing exclusively on the IP flow rather than on the data packets and the IP flow associated with these packets is incorrect.

2. "means for applying an advanced reservation algorithm"

The parties dispute the meaning of the term "means for applying an advanced reservation algorithm," which appears in claim 12 of the '971 patent. The parties' respective constructions are as follows:

IV's Proposed Construction	Defendants' Proposed Construction
Means-plus-function limitation under § 112 ¶ 6. Function: applying an advanced reservation algorithm Structure: MAC subframe schedulers 1566 or 1666 configured to assign future slots to data packets based on the priority of the IP data flow with which the packet is associated, as described at '971 Patent 23:14-35, 61:35-62:56, 63:47-57, 66:7-15, 67:36-50, 71:63-72:04, 72:53-66, 73:27-40, Figs. 14, 15A, 15B, 16A, and 16B.	Means-plus-function limitation under § 112 ¶ 6. Function: "applying an advanced reservation algorithm" Structure: downlink scheduler 1566 or uplink scheduler 1666 implementing an algorithm that determines the latency and jitter sensitivity of flows and then determines how to assign slots based on that determination (e.g., periodically or not, with what period), as described at '971 Patent 51:11-23, 61:6-16, 61:65-62:7, 62:32-37, Fig. 14.

The parties agree on the recited function and that the disclosed structure includes MAC subframe schedulers 1566 and 1666. The parties' dispute is regarding the algorithm disclosed by the specification. IV's proposed construction is taken verbatim from the specification: "**In the present invention**, an advanced reservation algorithm **assigns future slots to data packets based on the priority of the IP data flow with which the packet is associated**." '971 patent at 61:65-62:1 (emphasis added).

Defendants propose an "algorithm that determines the latency and jitter sensitivity of

flows and then determines how to assign slots based on that determination (e.g., periodically or not, with what period)." This construction is not taken from the specification and has no support in the intrinsic evidence. It seeks to narrow the claim scope to a single embodiment and should be rejected. Nothing in the specification requires the reservation algorithm to determine any latency or jitter sensitivities. *See id.* at 61:6-16, 62:32-37.

Defendants' construction also includes the confusing and incorrect phrase "e.g. periodically or not, with what period." Again, to the extent the language is intelligible, it is in no way tied to the function described in the claim. Again, Defendants are simply trying to narrow the claim language to avoid infringement, not properly interpreting the claim as one of skill in the art.

3. "means for reserving a first slot for a first data packet of an Internet Protocol (IP) flow in a future transmission frame based on said algorithm"

The parties dispute the meaning of the term "means for reserving a first slot for a first data packet of an Internet Protocol (IP) flow in a future transmission frame based on said algorithm," which appears in claim 12 of the '971 patent. The parties' respective constructions are as follows:

IV's Proposed Construction	Defendants' Proposed Construction
Means-plus-function limitation under § 112 ¶ 6. Function: reserving a first slot for a first data packet of an Internet Protocol (IP) flow in a future transmission frame based on said algorithm Structure: MAC subframe schedulers 1566 or 1666 configured to reserve slots in a future transmission frame in accordance with one or more of the patterns shown in Figure 14, by reserving a slot one or more frames in the	Means-plus-function limitation under § 112 ¶ 6. Function: reserving a first slot for a first data packet of an Internet Protocol (IP) flow in a future transmission frame based on said algorithm Structure: downlink scheduler 1566 or uplink scheduler 1666 implementing an algorithm for assigning a first future slot that is at least one frame in the future from the current frame based on the determination by the reservation

future, or as described at '971 Patent 23:14-35, 61:35-62:56, 63:47-57, 66:7-15, 67:36-50, 71:63-72:04, 72:53-66, 73:27-40, Figs. 14, 15A, 15B, 16A, and 16B.	algorithm of the latency- and jitter-sensitivity of the flows, as described at '971 Patent 62:7-17, 62:46-54, 67:36-47, 73:27-37, Fig. 14.

While the parties once again agree on the function of the term, and agree that the structure includes MAC subframe schedulers 1566 or 1666, they disagree as to the remainder of the structure. IV's proposed construction—that the schedulers are configured to reserve slots in a future transmission frame in accordance with one or more of the patterns shown in Figure 14, by reserving a slot one or more frames in the future—is fully supported by the specification and without any extraneous phrases or unnecessary confusion. *See, e.g.*, '971 patent at 61:35-62:56, 72:53-66, Fig 14. By contrast, Defendants once again attempt to add limitations to the structure that are both confusing and unsupported by the specification.

First, Defendants contend that the scheduler assigns future slots "based on the determination by the reservation algorithm of the latency- and jitter-sensitivity of the flows." For the same reasons stated above, this is plainly incorrect and contrary to the specification, which provides a much broader disclosure. *See id.* at 61:6-16, 62:32-37.

Second, Defendants introduce the phrase "current frame," which is found nowhere in the specification. Obviously, corresponding structures must be identified based on what is in the specification.

4. "means for reserving a second slot for a second data packet of said IP flow in a transmission frame subsequent in time to said future transmission frame based on said algorithm"

The parties' respective constructions are as follows:

IV's Proposed Construction	Defendants' Proposed Construction
Means-plus-function limitation under § 112 ¶ 6.	Means-plus-function limitation under § 112 ¶ 6.

Function: reserving a second slot for a second data packet of said IP flow in a transmission frame subsequent in time to said future transmission frame based on said algorithm Structure: MAC subframe schedulers 1566 or 1666 configured to reserve slots in a second future transmission frame, in accordance with one or more of the patterns shown in Figure 14, by reserving a slot two or more frames in the future, or as described at '971 Patent 23:14-35, 61:35-62:56, 63:47-57, 66:7-15, 67:36-50, 71:63-72:04, 72:53-66, 73:27-40, Figs. 14, 15A, 15B, 16A & 16B.	Function: "reserving a second slot for a second data packet of said IP flow in a transmission frame subsequent in time to said future transmission frame based on said algorithm" Structure: downlink scheduler 1566 or uplink scheduler 1666 implementing an algorithm for assigning a second future slot in a frame that is at least two frames in the future from the current frame based on the determination by the reservation algorithm of the latency- and jitter-sensitivity of the flows, as described at '971 Patent 62:7-17, 62:46-54, 67:36-47, 73:27-37, Fig. 14.

As with the "means for reserving a first slot" term, the parties agree on the recited function and further agree that the structure includes MAC subframe schedulers 1566 or 1666. Also, for the reasons described above, Defendants' proposed construction improperly and incorrectly incorporates a determination of latency- and jitter-sensitivity as well as introducing the term "current frame" which will confuse a jury. For these same reasons the court should adopt IV's proposed structure.

E. "means for taking into account service level agreement (SLA) based priorities for said IP flow"—'971 claim 18

The parties dispute the meaning of the term "means for taking into account service level agreement (SLA) based priorities for said IP flow," which appears in claim 18 of the '971 patent. The parties' respective constructions are as follows:

IV's Proposed Construction	Defendants' Proposed Construction
Means-plus-function limitation under § 112 ¶ 6. Function: taking into account service level agreement (SLA) based priorities for said IP flow Structure: Downlink scheduler 604/1566 or	Means-plus-function limitation under § 112 ¶ 6. Function: taking into account service level agreement (SLA) based priorities for said IP flow Structure: downlink scheduler 604/1566 or

uplink scheduler 634/1666 configured to use information from SLA priority data table 1570 to affect the queueing function and provide different service levels to users.	uplink scheduler 634/1666 implementing an algorithm that increases or decreases queuing priority of an IP flow based on the service level agreement of the user associated with the IP flow, as described at '971 Patent 53:49-57, 53:34-36, 66:57-63.

The parties agree on the recited function and agree that the structure includes downlink scheduler 604/1566 or uplink scheduler 634/1666. However, Defendants' additional proposed structure excludes all but one embodiment and is therefore improper.

IV's construction is again taken directly from the specification:

> **Downlink flow scheduler 604 places the data packets of an IP data flow into a class queue**, and based on a set of rules, schedules the data packets for transmission over the wireless medium to a subscriber CPE station using, e.g., an advanced reservation algorithm. **The rules can be determined by inputs to the downlink flow scheduler from** a hierarchical class-based priority processor module 1574, a virtual private network (VPN) directory enabled (DEN) data table 1572, and a **service level agreement (SLA) priority data table 1570**.

'971 patent at 63:47-56 (emphasis added).

Conversely, Defendants' construction requires "an algorithm that increases or decreases queuing priority of an IP flow." This is incorrect because, while the specification discloses taking into account service level agreement based priorities, nothing in the specification limits the scheduler to increasing or decreasing queueing priorities. *Id.* at 53:49-57. For example, the specification discloses that frame slots can be allocated based on the SLA priorities without queueing priorities ever changing. *Id.* ("PRIMMA MAC scheduler 604, 634 of wireless base station 302 can take into account SLA-based priorities in allocating available bandwidth to the subscriber CPE IP flows 902b, 904b, 906b and 908b. In the example illustration, IP flow 902b can be allocated frame slot 902c based on SLA priority 902a. Frame slots 904c, 906c and 908c can be similarly scheduled taking into account SLA priorities."). Moreover, the disclosed example is merely one embodiment of how the scheduler can be configured to use the

information from the SLA priority data table to affect queueing and service levels to users. Therefore, incorporating in the limitations of this one embodiment into the construction would be improper. *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 913 (Fed. Cir. 2004).

F. "the analyzed contents"/ "the analyzed packet contents"—'517 claims 1, 12

The parties dispute the meaning of the terms "the analyzed contents" and "the analyzed packet contents," which appear in claims 1 and 12 respectively of the '517 patent. The parties' respective constructions are as follows:

IV's Proposed Construction	Defendants' Proposed Construction
Plain meaning, the portion of the packets previously analyzed	"analyzed contents of the packets to be communicated over the shared wireless bandwidth in the downlink direction"

Support for IV's proposed construction is found throughout the '517 patent specification, which explains that shared wireless bandwidth may be allocated based on packet contents including packet headers or other packet contents. Ex. 4 ('517 patent) at 49:15-67, 52:38-40, 58:53-59:53, 61:44-59, 62:8-20, 62:21-64:13, 67:16-31, 67:56-58, 75:50-54, 76:51-55, Figs. 7-8, 13 and 15A. There does not appear to be any dispute between the parties that "contents" refers to packet headers in addition to packet payload.

In the context of claims 1 and 12, the terms "the analyzed contents" and "the analyzed packet contents" derive antecedent basis from preceding language. *Id.* at 81:30-33, 81:42-47, 82:35-41. In claim 1, the step of "analyzing contents of packets to be communicated over the shared wireless bandwidth" provides an antecedent for the step of "allocating the shared wireless

bandwidth … based on **the analyzed contents**." *Id.*[9] (emphasis added). IV's proposed construction acknowledges this antecedent relationship, and it is consistent with the plain language requiring that the "allocating" step must be performed "based on" the "contents" analyzed in the preceding "analyzing" step. Accordingly, IV's proposed construction resolves any question about the antecedent basis, and it does so without introducing the potential for confusion which is inherent in Defendants' proposal.

The purpose of claim construction is to "determin[e] the meaning and scope of the patent claims asserted to be infringed." *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 976 (Fed. Cir. 1995), *aff'd*, 517 U.S. 370 (1996). During the *Markman* phase, courts often ask whether a construction is helpful or "unhelpful for the jury to understand the term," and also whether the "claim language itself … provides more guidance than [a proposed construction]." *Apple, Inc. v. Samsung Elecs. Co.*, No. 11-CV-01846-LHK, 2012 WL 2993856, at *6 (N.D. Cal. July 20, 2012). Here, Defendants' proposed construction is unhelpful and it offers nothing beyond a repetition of the claim language. Defendants propose a copying of claim language from one part of the claim to another, which is potentially confusing to a jury. For example, if the claim language—"to be communicated over the shared wireless bandwidth in the downlink direction"—is copied from the "analyzing" step into the "allocating" step as Defendants propose, a jury might become confused and think that these claim limitations must be satisfied not just once, as the claim plainly requires, but twice as Defendants would have it.

As this Court has noted, "[t]he purpose of claim construction is 'to clarify and when necessary explain what the patentee covered by the claims.'" *Internet Machines LLC v.*

[9] Claim 12 similarly recites "the controller is configured to analyze contents of the packets received from the first interface" and "the controller is configured to allocate wireless bandwidth … responsive to the analyzed packet contents." '517 patent at 82:36-41.

Alienware Corp., No. 6:10-CV-023, 2011 WL 2551295, at *6 (E.D. Tex. June 24, 2011) (quoting *U.S. Surgical Corp. v. Ethicon, Inc.*, 103 F.3d 1554, 1568 (Fed. Cir. 1997)) (construing the term at issue to have its plain and ordinary meaning). As in the *Internet Machines* case, Defendants' attempt to copy limitations from the "analyzing" step into the "allocating" step should be rejected because it "add[s] nothing to the claims," and because "it is, at best, unhelpful, and at worst, confusing." *Id*. Moreover, this Court has also found that "where additional language may … redundant, it is in the court's power to determine that no construction is necessary." *800 Adept, Inc. v. AT & T Mobility, LLC*, No. 5:07CV23, 2008 WL 4831093, at *10 (E.D. Tex. July 23, 2008). Defendants' proposal should be rejected.

G. "allocating the shared wireless bandwidth between the wireless base station transmitting in the downlink direction and the at least one CPE station transmitting in the uplink direction"/ "allocate wireless bandwidth between the uplink direction and the downlink direction responsive to the analyzed packet contents and the analyzed reservation requests"—'517 claims 1, 12

The parties' respective constructions are as follows:

IV's Proposed Construction	Defendants' Proposed Construction
Plain meaning, no construction necessary.	"allocating the shared wireless bandwidth between (1) the wireless base station transmitting in the downlink direction and (2) the at least one CPE station transmitting in the uplink direction" / "allocate wireless bandwidth between (1) the uplink direction and (2) the downlink direction responsive to the analyzed packet contents and the analyzed reservation requests"

Defendants' proposal is not a construction at all, but rather an edited version of the claim language. Defendants have simply inserted "(1)" and "(2)" into the claim terms. These notational edits do nothing to assist the jury in understanding what is covered by the claims.

Here again, it is useful to consider that "[t]he purpose of claim construction is 'to clarify and when necessary explain what the patentee covered by the claims.'" *Internet Machines LLC,* No. 6:10-CV-023, 2011 WL 2551295, at *6. It is unclear what, if anything, the numerals add to the claim, but Defendants' proposal is unsupported by any of the intrinsic evidence. As such, Defendants' proposed notation should be rejected because "it is, at best, unhelpful, and at worst, confusing." *Id*.; *800 Adept, Inc.*, No. 5:07CV23, 2008 WL 4831093, at *10.

H. "said plurality of packets"—'206 claim 109

The parties dispute the meaning of the term "said plurality of packets," which appears in claim 109 of the '206 patent. The parties' respective constructions are as follows:

IV's Proposed Construction	Defendants' Proposed Construction
Plain meaning, said two or more packets	"the plurality of packets" that are communicated over a shared wireless bandwidth are the same plurality of packets that are classified

The method of claim 109 has the following steps:

> A method for scheduling packets comprising:
> **classifying a plurality of packets** according to end-user quality of service (QoS) requirements of said plurality of packets; and
> **scheduling said plurality of packets** for communication in at least one of an upstream direction and a downstream direction over a shared wireless bandwidth according to a scheduling algorithm.

The term "said plurality of packets" should be given its plain and ordinary meaning. A plurality of packets means two or more.[10] There is nothing mysterious here.

[10] Nor did the inventor act as his own lexicographer with respect to "said plurality of packets," as compared to the inventor's decision to define over 50 other terms in Table I. *See* '206 patent at 7:30-10:38. In fact, the term "plurality of packets" does not appear in the specification outside of claims 109, 116, and 136.

Defendants' construction rewrites the claim. A plurality of packets is first classified and then scheduled. Defendants' construction requires an additional step: that the plurality of packets must also be actually communicated (*i.e.*, transmitted and/or received). This goes beyond the scope of claim 109, which only requires that the packets are "schedul[ed] . . . for communication." '206 patent, cl. 109.

Moreover, Defendants' construction is circular and confusing and therefore is not helpful to a jury. *Funai Elec. Co., Ltd. v. Daewoo Elecs. Corp.*, 616 F.3d 1357, 1366 (Fed. Cir. 2010) ("The criterion is whether the explanation aids the court and the jury in understanding the term as it is used in the claimed invention."); *Beneficial Innovations, Inc. v. Advance Publ'ns, Inc.*, No. 2:11-CV-229-JRG-RSP, 2014 WL 12603161, at *8 n.4 (E.D. Tex. July 2, 2014) ("In claim construction, the Court, as a legal inquiry, construes the language of patent terms, consistent with the specification, as an aide [sic] to the jury."). "Said plurality of packets" appears in both limitations of claim 109. As a result, plugging Defendants' construction into the "classifying" step results in a claim limitation that does not make sense:

> **classifying a plurality of packets** according to end-user quality of service (QoS) requirements of [~~said plurality of packets~~/"the plurality of packets" that are communicated over a shared wireless bandwidth are the same plurality of packets that are classified]

It is not clear what the Defendants are driving at in their attempt to rewrite the claim, but their proposal is neither warranted by the intrinsic evidence nor helpful to the jury. The Defendants' construction should be rejected.

IV. CONCLUSION

For all the foregoing reasons, Plaintiffs respectfully request that the Court adopt IV's proposed constructions for each of the terms in dispute.

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Respectfully submitted,

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CERTIFICATE OF SERVICE

I hereby certify that a copy of the foregoing document was filed electronically in compliance with Local Rule CV-5(a). Therefore, this document was served on all counsel who are deemed to have consented to electronic service. Local Rule CV-5(a)(3)(A). Pursuant to Fed. R. Civ. P. 5(d) and Local Rule CV-5(d) and (e), all other counsel of record not deemed to have consented to electronic service were served with a true and correct copy of the foregoing by email on this the 25th day of July, 2018.

/s/ Andrea Fair